Title (en)

OPERATING MECHANISM FOR AN ELECTRIC SWITCH WITH THREE POSITIONS

Publication

EP 0212427 B1 19890531 (DE)

Application

EP 86110816 A 19860805

Priority

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Abstract (en)

[origin: EP0212427A1] 1. Drive for an electric three-position switch, comprising : a switch shaft (1) a crank lever (2) combined with the switch shaft (1) a force-transmitting device a link pin (17, 18) connecting the crank lever (2) and the force-transmitting device a switch spring (4) in the form of a tension spring, and a further switch spring (5) a handle (6) an approximately hammer-shaped rocker arm (7) combined with the switch shaft (1), and a stop device consisting of a plurality of stop elements and two pawls (8, 9) which can each be rocked about a pin (12, 13) against a spring force, characterised by the features : a) the force-transmitting device consists of two four-bar chains symmetrically juxtaposed to one another, each of which comprises an outer link (14, 16; 15, 17) which is set at an angle before each switching action and consists of an outer component (14; 15), a centre component (16; 17) connected to the crank lever (2) by means of the link pin (3), and a further link pin which connects the outer component (14; 15) and the centre component (16; 17), as well as an outer pin (20; 21) which is fixedly mounted on a frame (22/23) common to the four-bar chains ; b) the centre components (16; 17) of the two four-bar chains are combined with one another by the link pin (3) ; c) the link pin (3) and the switch shaft (1) are points of articulation of the two four-bar chains ; d) the crank lever (2) is a common inner component of the two four-bar chains ; e) the further switch spring (5) is also a tension spring and is connected at one end, either directly or by means of an intermediate member (25), to the further link pin (19), while the other switch spring (4) is connected, symmetrically in relation thereto, to the other further link pin (18) ; f) the free ends of the switch springs (4; 5) each engage with a respective sliding support (30; 31) which is provided with a pawl stop (40; 41) and can be shifted in the frame (22, 23) for the purpose of tensioning the associated switch spring (4; 5) ; g) the handle (6) is divided, by a pivot pin (42) fixedly mounted in the frame (22/23), into a force arm (6a) and a load arm (6b) which is formed as a cross member at each end for shifting a sliding support (30; 31) ; h) the pawl stop (40; 41) of each sliding support (30; 31) is situated in the path of the rocking motion of the associated pawl until a predetermined tension of the associated switch spring (4; 5) is reached, but lies outside the path of the rocking motion of the associated pawl (8; 9) after the switch spring (4; 5) has reached the predetermined tension and an excess tension caused by an excess travel of the sliding support (30; 31) ; i) there is provided at one end of each pawl (8; 9) a driving pin (43; 44) which is flanked by two rod elements (45; 46; 47; 48) which are connected together by a draw spring (49; 50) and one of which extends from a stop element constructed as a circuit-opening halfshaft (51; 52), and the other from a stop element constructed as a circuit-closing half-shaft (53; 54) ; j) all the half-shafts (51 - 54) are disposed on an arc of a circle around the switch shaft (1), the two circuit-opening half-shafts (51, 52) being flanked by the circuit-closing half-shafts (53, 54) ; k) each circuit-closing half-shaft (53, 54) lies in the path of the rocking motion of the rocker arm (7) before and during a tensioning of the switch spring (4; 5) closer to it, but outside the path of the said motion at the beginning of a detensioning of the switch spring (4; 5) due to a moment of rotation (45; 48) exerted on its rod element by the driving pin (43; 44) of the associated pawl (8; 9) ; l) after detensioning of a switch spring (4; 5), its outer link (14, 16; 15, 17) occupies substantially an extended position and the switch shaft (1) occupies a circuit-closing position due to the moment of rotation exerted on the crank lever (2) by the respective centre component (16; 17) in the detensioning of the switch spring (4; 5), while the other outer link (14, 16; 15, 17) is set at an angle, the associated switch spring (4; 5) is tensioned and that circuit-opening half-shaft (51; 52) which lies closer to the detensioned switch spring (4; 5) is interlocked with the rocker arm (2) ; m) when the force arm (6a) of the handle (6) has been freed, a residual tension of the respective detensioned switch spring (4; 5) is available for cancelling the excess travel of the associated sliding support (30; 31) and available for a subsequent pawl-setting travel, at which that circuit-opening halfshaft (51; 52) which interlocks with the rocker arm (8) is rotated into a position in which it obstructs the return motion of the rocker arm (2) due to a moment of rotation imparted to it by the associated draw spring (49; 50) ; n) each pawl (8; 9) is provided with a return pin (55; 56) which is opposed to its driving pin (42; 43) and which forms a point of engagement for the spring force (10; 11), the said return pin being designed to rock the pawl (8; 9) out of its slip position by means of a lug (57; 58) on the load arm (6b) of the handle (6) ; o) each circuit-opening half-shaft (51; 52) can be actuated manually and/or by remote control.

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